

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appeal No. _____

Application No.: 10/829,131
Filing Date: April 21, 2004
Appellants: James Chieh-Tsung Chen et al.
Group Art Unit: 2617
Examiner: German Viana Di Prisco
Title: ALL-IN-ONE WIRELESS NETWORK

BRIEF ON APPEAL ON BEHALF OF APPELLANT
UNDER 37 C.F.R. §41.37

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Due: September 29, 2008

This appeal is from the decision of the Patent Examiner dated August 29, 2008, rejecting claims 1-54, which are reproduced in Appendix A of this Appeal Brief.

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BRIEF ON APPEAL ON BEHALF OF APPELLANTS

In support of the Notice of Appeal filed June 30, 2008 appealing the Examiner's Final Rejection of each of claims 1-54 mailed August 29, 2008, which appear in the attached Appendix A, Appellants hereby provide the following remarks.

I. REAL PARTY IN INTEREST

The present Application was assigned from the inventors, James Chieh-Tsung Chen, Chuong Vu, Chor-Teck Law, Binh Quoc Tran, Jiaqi Shen, and Brian Bosso, to Marvell Semiconductor, Inc. recorded on April 21, 2004 at reel/frame 015253/0168 and from Marvell Semiconductor, Inc. to Marvell International Ltd. recorded on April 21, 2004 at reel/frame 015253/0143.

II. RELATED APPEALS AND INTERFERENCES

The undersigned, the Assignee and the Appellants do not know of any appeals or interferences which would directly affect or which would be directly affected by, or have a bearing on, the Board's decision in this Appeal.

III. STATUS OF THE CLAIMS

Claims 1-54 are reproduced in the attached Appendix A and are the claims on Appeal. Each of these claims is currently pending in the Application.

IV. STATUS OF ANY AMENDMENTS FILED SUBSEQUENT TO THE FINAL REJECTION

No amendments have been filed after the Final Rejection dated August 29, 2008.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Various embodiments of the present Application relate to a wireless network device 300 for communicating with a network, as discussed in Page 5, Paragraph [0021]. For example, claim 1 includes memory 314 to store an image 402. Page 5, Paragraph [0021]-Page 6, Paragraph [0022]. The image 402 includes a plurality of virtual machines 406A-406N (collectively 406) and only one multi-tasking operating system 404. Page 6, Paragraphs [0022]-

[0023]. Each of the virtual machines 406 includes a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Id. A processor 302 of the wireless network device 300 executes the virtual machines. A port 304 of the wireless network device 300 includes a physical-layer device 414 to communicate with the network and a media access controller 412 to communicate with the physical-layer device 414 and the processor 302. Id.

Further, the memory 314 of claim 4 includes a virtual machine queue 704A for each virtual machine 406 and a processor queue 702 for the processor 302. Page 7, Paragraph [0029]. The processor 302 stores data to be processed for the virtual machine being executed by the processor 302 in the processor queue 702. Id. Each virtual machine 406 creates a copy in the respective virtual machine queue 704A of the data in the processor queue 702 when the processor is executing the respective virtual machine. Id. When the processor 302 resumes executing one of the virtual machines 406A after executing another of the virtual machines 406B, the one of the virtual machines 406A copies the data from the respective virtual machine queue 704A to the processor queue 702. Page 7, Paragraphs [0029]-[0030].

Similar to claim 1, claim 10 includes a method for a wireless network device 300 to communicate with a network, as discussed in Page 5, Paragraph [0021]. The method includes storing an image 402 comprising a plurality of virtual machines 406 and only one multi-tasking operating system 404. Page 5, Paragraph [0021]-Page 6, Paragraph [0023]. Each of the virtual machines 406 comprises a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Id. The method also includes executing the virtual machines 406.

Similarly, claim 17 includes a wireless network device 300 for communicating with a network, as discussed in Page 5, Paragraph [0021]. The wireless network device 300 includes a memory to store an image 402. Page 5, Paragraph [0021]-Page 6, Paragraph [0022]. The image 402 includes a plurality of virtual machines 406 and only one multi-tasking operating system 404. Id. Each of the virtual machines 406 comprises a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Id. The wireless network device 300 also includes a processor 302 to execute the virtual machines 406 and a bus 616 to communicate with the processor 302 and the network. Page 7, Paragraph [0027].

Similarly, claim 28 includes a wireless network device 300 for communicating with a network, as discussed in Page 5, Paragraph [0021]. The wireless network device 300 includes memory means for storing an image 402 comprising a plurality of virtual machines 406 and only one multi-tasking operating system 404. Page 5, Paragraph [0021]-Page 6, Paragraph [0022]. Each of the virtual machines 406 comprises a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Page 6, Paragraph [0023]. The wireless network device 300 also includes processing means for executing the virtual machines 406 and port means. The port means include physical-layer means 414 for communicating with the network and media access control means 412 for communicate with the physical-layer means 414 and the processing means 302. Page 7, Paragraphs [0026]-[0027].

Similarly, claim 37 includes a computer program embodying instructions recorded on a computer readable medium executable by a computer for a wireless network device 300 to communicating with a network, as discussed in Page 5, Paragraph [0021]. The computer program includes storing an image 402 comprising a plurality of virtual machines 406 and only one multi-tasking operating system 404. Page 5, Paragraph [0021]-Page 6, Paragraph [0022]. Each of the virtual machines 406 includes a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Page 6, Paragraph [0023]. The computer program also includes executing the virtual machines 406.

Similarly, claim 44 includes a wireless network device 300 for communicating with a network, as discussed in Page 5, Paragraph [0021]. The wireless network device 300 includes memory means for storing an image 402 comprising a plurality of virtual machines 406 and only one-multi-tasking operating system 404. Page 5, Paragraph [0021]-Page 6, Paragraph [0022]. Each of the virtual machines 406 includes a wireless network application (e.g. virtual bridge 916A) to execute on the multi-tasking operating system 404. Page 6, Paragraph [0023]. The wireless network device 300 also includes processing means 302 for executing the virtual machines 406 and bus means 616 for communicating with the processing means 302 and the network. Page 7, Paragraph [0027].

Note that the aforementioned Summary of the Claimed Subject Matter, including indications of reference numerals, drawing Figures, and paragraph and page numbers of the Application, have been provided solely to comply with U.S. Patent and Trademark Office rules concerning the appeal of claims of an Application. The above-mentioned descriptions are

merely exemplary and should not be considered, in any way, to limit the claims of the present Application.

VI. GROUND'S OF REJECTION TO BE REVIEWED ON APPEAL

Appellants seek the Board's review of the rejection of claims 1, 3, 6, 10, 17, 19, 21-23, 28, 30, 33, 44, 46, 48-50 under 35 U.S.C. 102(b) as being unpatentable over Bauchot et al. (U.S. Pat. No. 5,644,576).

Appellants also seek the Board's review of the rejection of claims 37 and 39-43 under 35 U.S.C. 102(e) as being unpatentable over Meredith et al. (Pat. Pub. No. 2003/0212761).

Appellants also seek the Board's review of the rejection of claims 2, 11, 18, 29, and 45 under 35 U.S.C. 103(a) as unpatentable over Bauchot.

Appellants also seek the Board's review of the rejection of claims 4-5, 7, 8, 12-16, 20, 24, 25-26, 31-32, 34-35, 47, and 51-53 under 35 U.S.C. 103(a) as being unpatentable over Bauchot in view of Meredith.

Appellants also seek the Board's review of the rejection of claims 9, 27, 36 and 54 under 35 U.S.C. 103(a) as being unpatentable over Bauchot in view of Shuen (U.S. Pat. No. 5,572,528).

Appellants also seek the Board's review of the rejection of claim 38 under 35 U.S.C. 103(a) as being unpatentable over Meredith.

VII. ARGUMENTS

A. Claims 1, 3, 6, 10, 17, 19, 21-23, 28, 30, 33, 44, 46, 48-50 under 35 U.S.C.

§102(b) in view of Bauchot ‘576 patent

1. Distinctions regarding independent claims 1, 10, 17, 28, and 44

With respect to claim 1, Bauchot does not at least show, teach or suggest memory to store an image comprising a plurality of virtual machines and only one multi-tasking operating system. **Each of the virtual machines includes a wireless network application to execute on the multi-tasking operating system.**

As best understood by Appellants, Bauchot is directed to a typical media access control scheme for a WLAN that, among other things, **does not show teach or suggest virtual machines**. Nevertheless, the Examiner asserts that “application programs” of Bauchot may be considered virtual machines.

Appellants have carefully reviewed Bauchot and fail to find any disclosure, teaching, or suggestion that the “application programs” are virtual machines. Virtual machines, as discussed in Paragraph [0023] of the Application, include software that creates a virtualized environment between the computer platform and its operating system and allow one physical resource to function as multiple physical resources.

In other words, claim 1 provides a network device, having limited physical resources, with multiple virtual machines that include multiple wireless applications. Examples of wireless applications include a wireless access point application and a wireless client application. Because of the virtualized environment, the virtual machines may operate concurrently without having to shut down or boot-up to switch between wireless applications. **The network device of claim 1 may therefore switch between wireless applications of the virtual machines without having to separately boot-up each wireless application** because the virtual machines may run concurrently in the virtual environment. In contrast, switching between typical wireless devices to use a physical resource, as would presumably be the case in Bauchot, generally requires separate booting-up or activating operations of the wireless devices for each use of the physical resource.

Bauchot does not discuss how a processor switches between application programs, nor does Bauchot even mention that the application programs are virtual machines.

Further, according to the Examiner, each “application program” comprises a wireless network application, according to Column 5, Lines 65-67. Column 5, Lines 65-67 recite: “(t)he computer 50 runs an operating system 70 which supports one or more user application programs 72.” Appellants have carefully reviewed this section and fail to find the claimed feature. Instead, it appears that **the user application programs of Bauchot are typical user interface programs**. The user application programs are all included in (but do not include) a single wireless device, such as a remote station or base station, as seen in Fig. 2 of Bauchot. As best understood, **Bauchot does not assert that the user application programs each include wireless application programs**.

For anticipation to be present under 35 U.S.C §102(b), there must be no difference between the claimed invention and the reference disclosure as viewed by one skilled in the field of the invention. *Scripps Clinic & Res. Found. V. Genentech, Inc.*, 18 USPQ.2d 1001 (Fed. Cir. 1991). All of the limitations of the claim must be inherent or expressly disclosed and must be arranged as in the claim. *Constant v. Advanced Micro-Devices, Inc.*, 7 USPQ.2d 1057 (Fed. Cir. 1988).

Each of the claimed virtual machines includes a wireless network application, such as a wireless access point that executes on a multi-tasking operating system. Bauchot does not at least show, teach, or suggest that the user application programs are virtual machines with each including a wireless network application.

Therefore, claim 1 is believed to be allowable for at least these reasons. Claims 17, 28, 37 and 44 are allowable for at least similar reasons as claim 1.

2. Dependent claims 3, 6, 19, 21-23, 30, 33, 46 and 48-50

With regard to dependent claims 3, 6, 19, 21-23, 30, 33, 46 and 48-50, these claims are allowable for at least the reasons previously presented with regard to their corresponding independent claims. Accordingly, it is respectfully requested that the rejection of the dependent claims be overturned.

C. Claims 37 and 39-43 under 35 U.S.C. §102(e) in view of Meredith et al. (U.S. Pub. No. 2003/0212761)

1. Distinctions regarding independent claim 37

With respect to claim 37, Meredith does not at least show, teach, or suggest a plurality of virtual machines with each including a wireless network application.

As best understood by Appellants, Meredith is directed to a process kernel that connects application programs to the hardware of a computer. **The Examiner asserts that application programs of Meredith are virtual machines** with each including a wireless network application. However, Meredith does not support this assertion.

Instead, Meredith uses virtual machines *within* the process kernel, as is common. **The process kernel does not include wireless network applications. Further, the process kernel is not included within the application programs.**

For anticipation to be present under 35 U.S.C §102(b), there must be no difference between the claimed invention and the reference disclosure as viewed by one skilled in the field of the invention. *Scripps Clinic & Res. Found. V. Genentech, Inc.*, 18 USPQ.2d 1001 (Fed. Cir. 1991). All of the limitations of the claim must be inherent or expressly disclosed and must be arranged as in the claim. *Constant v. Advanced Micro-Devices, Inc.*, 7 USPQ.2d 1057 (Fed. Cir. 1988). Meredith does not at least show, teach, or suggest a plurality of virtual machines with each including a wireless network application.

Therefore, claim 37 is believed to be allowable for at least the above reasons.

2. Dependent claims 39-43

With regard to the various dependent claims, these claims are allowable for at least the reasons previously presented with regard to their corresponding independent claim. Accordingly, it is respectfully requested that the rejection of the dependent claims be overturned.

D. Claims 2, 11, 18, 29 and 45 under 35 U.S.C. §103(a) in view of Bauchot et al. '576 patent

1. Distinctions regarding dependent claims 2, 11, 18, 29 and 45

With regard to the various dependent claims 2, 11, 18, 29 and 45, these claims are allowable for at least the reasons previously presented with regard to their corresponding independent claims. Accordingly, it is respectfully requested that the rejection of the dependent claims be overturned.

E. Dependent claims 4-5, 7, 8, 12, 14, 15, 16, 20, 24, 25-26, 31-32, 34-35, 47 and 51-53 are rejected under 35 U.S.C. §103(a) in view of Meredith et al. (U.S. Pub. No. 2003/0212761)

1. Distinctions regarding independent claim 4

With respect to claim 4, Bauchot and Meredith at least do not show, teach or suggest that the processor resumes executing one of the virtual machines after executing another of the virtual machines. The one of the virtual machines copies the data from the respective virtual machine queue to the processor queue.

As best understood by Appellants, Bauchot does not include virtual machines, as discussed above. Further, the Examiner recognizes that Bauchot fails to disclose a virtual machine queue element and processor queue element as claimed. The Examiner alleges that Meredith describes the claimed features in Paragraph [0048] that provides:

The queue 310 through which processes communicate can take various forms, such as databases, channels, or other suitable structured stores. Because the computing devices 302, 304 can be located at geographic locations well away from each other, processes 302B, 304B cannot communicate via shared memory. Suitable communication means, such as the queue 310, include technology that enables processes 302B, 304B while running at different times to communicate across heterogeneous networks and systems that may be temporarily offline... When the queues 310-316 are databases, they are files composed of records, each containing fields together with a set of operations for searching, sorting, recombining, and other processing functions, organized in multiple tables, each of which are data structures characterized by rows and columns, with data occupying or potentially occupying each cell formed by a row-column intersection.

Appellants have carefully reviewed Paragraph [0048] and fail to find the virtual machine queues and processor queue functionality as claimed.

Each virtual machine of claim 4 creates a copy of data in the processor queue when the processor is executing that virtual machine. The virtual machine stores the copy of the data when the processor is executing a different virtual machine and reloads the data to the processor queue when the processor is again executing the original virtual machine. The queues of Meredith, on the other hand, merely appear to include data relating to the implementation of kernel applications but do not appear to copy that data from a processor as claimed.

Although Paragraph [0048] does discuss use of queues to run processes at different times, no reason is provided as to why the queues of Meredith should be modified as proposed. The claimed processor stores data to be processed for a virtual machine being executed by the processor in a processor queue. Each virtual machine includes a virtual queue that stores a copy of the data to be processed by that virtual machine (for example, as of the time the processor stops executing that virtual machine) while the processor is executing another virtual machine. When the processor resumes executing the first virtual machine, the first virtual machine copies data from its queue to the processor queue. In this way, the processor does not lose data when switching between virtual machines or does not require rebooting of data as would be the case in Meredith.

Therefore, claim 4 is allowable for at least the above reasons. Accordingly, it is respectfully requested that the rejection of the dependent claim be overturned.

2. Dependent claims 5, 7, 8, 12, 14, 15, 16, 20, 24, 25-26, 31-32, 34-35, 47 and 51-53

Claims 5, 7, 8, 12-16, 20 24, 25-26, 31-32, 34-35, 47, 51-53 are allowable for at least similar reasons as claim 4. Further, dependent claims 4-5, 7, 8, 12, 14, 15, 16, 20, 24, 25-26, 31-32, 34-35, 47 and 51-53, are allowable for at least the reasons previously presented with regard to their corresponding independent claims. Accordingly, it is respectfully requested that the rejection of the dependent claims be overturned.

F. Claims 9, 27, 36 and 54 under 35 U.S.C. §103(a) in view of Bauchot ‘576 patent and Shuen ‘528 patent

1. Distinctions regarding dependent claims 9, 27, 36 and 54

With regard to the various dependent claims 9, 27, 36 and 54, these claims are allowable for at least the reasons previously presented with regard to their corresponding independent claims. Accordingly, it is respectfully requested that the rejection of the dependent claims be overturned.

G. Claim 38 under 35 U.S.C. §103(a) in view of Meredith et al.

1. Distinctions regarding dependent claim 38

With regard to the various dependent claim 38, this claim is allowable for at least the reasons previously presented with regard to their corresponding independent claims. Accordingly, it is respectfully requested that the rejection of the dependent claim be overturned.

VIII. CONCLUSION

Appellants respectfully submit that the prior art does not teach or suggest many of the network device components present in the various claims. Accordingly, for at least the aforementioned reasons, Appellants respectfully request the Honorable members of the Board of Patent Appeals and Interferences to reverse the outstanding rejections in connection with the present Application and permit each of claims 1 – 54 to be passed to allowance in connection with the present Application.

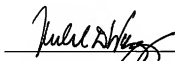
Should there be any outstanding matters that need to be resolved in the present Application, the Examiner is respectfully requested to contact Michael D. Wiggins, Reg. No. 34,754 at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNES, DICKEY, & PIERCE, P.L.C.

By



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IX. Claims Appended APPENDIX A

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the Application.

1. A wireless network device for communicating with a network comprising:
 - a memory to store an image comprising a plurality of virtual machines and only one multi-tasking operating system, wherein each of the virtual machines comprises a wireless network application to execute on the multi-tasking operating system;
 - a processor to execute the virtual machines; and
 - a port comprising
 - a physical-layer device to communicate with the network, and
 - a media access controller to communicate with the physical-layer device and the processor.
2. A wireless network device according to claim 1 which is compliant with a standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b, 802.11g and 802.11n.
3. The wireless network device of claim 1, wherein the memory comprises a non-volatile memory, further comprising:
 - a volatile memory; and
 - a memory controller to create a copy of the image from the non-volatile memory to the volatile memory;
 - wherein the processor executes the virtual machines from the volatile memory.
4. The wireless network device of claim 1:
 - wherein the memory comprises a virtual machine queue for each virtual machine and a processor queue for the processor;
 - wherein the processor stores data to be processed for the virtual machine being executed by the processor in the processor queue;

wherein each virtual machine creates a copy in the respective virtual machine queue of the data in the processor queue when the processor is executing the respective virtual machine; and

wherein when the processor resumes executing one of the virtual machines after executing another of the virtual machines, the one of the virtual machines copies the data from the respective virtual machine queue to the processor queue.

5. The wireless network device of claim 1, wherein at least one of the wireless network applications is selected from the group consisting of:

- a wireless network access point;
- a wireless network client;
- a wireless network point-to-point bridge;
- a wireless network multi-point bridge; and
- a wireless network repeater.

6. The wireless network device of claim 1, wherein the image further comprises:
an plurality of virtual machine device drivers to communicate with the virtual machines; and

a media access controller device driver to communicate with the virtual machine device drivers and the media access controller.

7. The wireless network device of claim 1, further comprising:
an input device to select one or more of the virtual machines;
wherein the processor executes the virtual machines selected by the input device.

8. The wireless network device of claim 1, wherein the processor executes a plurality of the virtual machines concurrently.

9. The wireless network device of claim 1:
wherein the virtual machines comprise a wireless network access point virtual machine and a wireless network client virtual machine;

wherein the processor executes the wireless network access point virtual machine and the wireless network client virtual machine concurrently;

wherein the wireless network client virtual machine comprises

a first virtual wireless port to communicate with the port, and

a first virtual bridge to communicate with the first virtual wireless port; and

wherein the wireless network access point virtual machine comprises

a second virtual wireless port to communicate with the port,

a virtual distribution service port to communicate with the first virtual

bridge, and

a second virtual bridge to communicate with the second virtual wireless port and the virtual distribution service port.

10. A method for a wireless network device for communicating with a network comprising;

storing an image comprising a plurality of virtual machines and only one multi-tasking operating system, wherein each of the virtual machines comprises a wireless network application to execute on the multi-tasking operating system; and

executing the virtual machines.

11. The method of claim 10, wherein the wireless network device is compliant with a standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b, 802.11g and 802.11n.

12. The method of claim 10, wherein the image is stored in a non-volatile memory, further comprising:

copying the image from the non-volatile memory to a volatile memory; and

wherein the virtual machines are executed from the volatile memory.

13. The method of claim 10, further comprising:

creating in the volatile memory a virtual machine queue for each virtual machine and a processor queue for a processor;

storing in the processor queue data to be processed for the virtual machine being executed;

creating a copy in the respective virtual machine queue of the data in the processor queue when the respective virtual machine is executing; and

wherein when one of the virtual machines resumes executing after another of the virtual machines was executing, copying the data from the respective virtual machine queue to the processor queue.

14. The method of claim 10, wherein at least one of the wireless network applications is selected from the group consisting of:

- a wireless network access point;
- a wireless network client;
- a wireless network point-to-point bridge;
- a wireless network multi-point bridge; and
- a wireless network repeater.

15. The method of claim 10, further comprising:
executing selected ones of the virtual machines in accordance with an input.

16. The method of claim 10, further comprising:
executing a plurality of the virtual machines concurrently.

17. A wireless network device for communicating with a network comprising:
a memory to store an image comprising a plurality of virtual machines and only one multi-tasking operating system, wherein each of the virtual machines comprises a wireless network application to execute on the multi-tasking operating system;
a processor to execute the virtual machines; and
a bus to communicate with the processor and the network.

18. A wireless network device according to claim 17 which is compliant with a standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b, 802.11g and 802.11n.

19. The wireless network device of claim 17, wherein the memory comprises a non-volatile memory, further comprising:

a volatile memory; and

a memory controller to create a copy of the image from the non-volatile memory to the volatile memory;

wherein the processor executes the virtual machines from the volatile memory.

20. The wireless network device of claim 17:

wherein the memory comprises a virtual machine queue for each virtual machine and a processor queue for the processor;

wherein the processor stores data to be processed for the virtual machine being executed by the processor in the processor queue;

wherein each virtual machine creates a copy in the respective virtual machine queue of the data in the processor queue when the processor is executing the respective virtual machine; and

wherein when the processor resumes executing one of the virtual machines after executing another of the virtual machines, the one of the virtual machines copies the data from the respective virtual machine queue to the processor queue.

21. The wireless network device of claim 17, wherein the image further comprises:

a plurality of virtual machine device drivers to communicate with the virtual machines; and

a bus interface driver to communicate with the virtual machine device drivers and the bus.

22. The wireless network device of claim 17, further comprising:

a physical-layer device to communicate with the network; and

a media access controller to communicate with the physical-layer device and the bus.

23. The wireless network device of claim 22, wherein the image further comprises:
a plurality of virtual machine device drivers to communicate with the virtual machines;
a first bus interface driver to communicate with the virtual machine device drivers and the bus;
a second bus interface driver to communicate with the bus; and
a media access controller device driver to communicate with the second bus interface driver and the media access controller.

24. The wireless network device of claim 17, wherein at least one of the wireless network applications is selected from the group consisting of:
a wireless network access point;
a wireless network client;
a wireless network point-to-point bridge;
a wireless network multi-point bridge; and
a wireless network repeater.

25. The wireless network device of claim 17, further comprising:
an input device to select one or more of the virtual machines;
wherein the processor executes the virtual machines selected by the input device.

26. The wireless network device of claim 17, wherein the processor executes a plurality of the virtual machines concurrently.

27. The wireless network device of claim 17:
wherein the virtual machines comprise a wireless network access point virtual machine and a wireless network client virtual machine;

wherein the processor executes the wireless network access point virtual machine and the wireless network client virtual machine concurrently;

wherein the wireless network client virtual machine comprises

a first virtual wireless port to communicate with the bus, and

a first virtual bridge to communicate with the first virtual wireless port;

and

wherein the wireless network access point virtual machine comprises

a second virtual wireless port to communicate with bus,

a virtual distribution service port to communicate with the first virtual

bridge, and

a second virtual bridge to communicate with the second virtual wireless

port and the virtual distribution service port.

28. A wireless network device for communicating with a network comprising:

memory means for storing an image comprising a plurality of virtual machines and only one multi-tasking operating system, wherein each of the virtual machines comprises a wireless network application to execute on the multi-tasking operating system;

processing means for executing the virtual machines; and

port means comprising

physical-layer means for communicating with the network, and

media access control means for communicate with the physical-layer means and the processing means.

29. A wireless network device according to claim 28 which is compliant with a standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b, 802.11g and 802.11n.

30. The wireless network device of claim 28, wherein the memory means comprises non-volatile memory means, further comprising:

volatile memory means; and

memory controller means for creating a copy of the image from the non-volatile memory means to the volatile memory means;

wherein the processing means executes the virtual machines from the volatile memory means.

31. The wireless network device of claim 28:

wherein the memory means comprises a virtual machine queue means for each virtual machine and a processor queue means for the processing means;

wherein the processing means stores data to be processed for the virtual machine being executed by the processing means in the processor queue means;

wherein each virtual machine creates a copy in the respective virtual machine queue means of the data in the processor queue means when the processing means is executing the respective virtual machine; and

wherein when the processing means resumes executing one of the virtual machines after executing another of the virtual machines, the one of the virtual machines copies the data from the respective virtual machine queue means to the processor queue means.

32. The wireless network device of claim 28, wherein at least one of the wireless network applications is selected from the group consisting of:

- a wireless network access point;
- a wireless network client;
- a wireless network point-to-point bridge;
- a wireless network multi-point bridge; and
- a wireless network repeater.

33. The wireless network device of claim 28, wherein the image further comprises:

a plurality of virtual machine device drivers to communicate with the virtual machines; and

a media access controller device driver to communicate with the virtual machine device drivers and the media access control means.

34. The wireless network device of claim 28, further comprising:
input means for selecting one or more of the virtual machines;
wherein the processing means executes the virtual machines selected by the input means.
35. The wireless network device of claim 28, wherein the processing means executes a plurality of the virtual machines concurrently.
36. The wireless network device of claim 28:
wherein the virtual machines comprise a wireless network access point virtual machine and a wireless network client virtual machine;
wherein the processing means executes the wireless network access point virtual machine and the wireless network client virtual machine concurrently;
wherein the wireless network client virtual machine comprises
a first virtual wireless port to communicate with the port means, and
a first virtual bridge to communicate with the first virtual wireless port;
and
wherein the wireless network access point virtual machine comprises
a second virtual wireless port to communicate with the port means,
a virtual distribution service port to communicate with the first virtual bridge, and
a second virtual bridge to communicate with the second virtual wireless port and the virtual distribution service port.
37. A computer program embodying instructions recorded on a computer readable medium executable by a computer for a wireless network device for communicating with a network comprising:
storing an image comprising a plurality of virtual machines and only one multi-tasking operating system, wherein each of the virtual machines comprises a wireless network application to execute on the multi-tasking operating system; and
executing the virtual machines.

38. The computer program of claim 37, wherein the wireless network device is compliant with a standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b, 802.11g and 802.11n.

39. The computer program of claim 37, wherein the image is stored in a non-volatile memory, further comprising:

- copying the image from the non-volatile memory to a volatile memory; and
- wherein the virtual machines are executed from the volatile memory.

40. The computer program of claim 37, further comprising:

- creating in the volatile memory a virtual machine queue for each virtual machine and a processor queue for a processor;
- storing in the processor queue data to be processed for the virtual machine being executed;

- creating a copy in the respective virtual machine queue of the data in the processor queue when the respective virtual machine is executing; and

- wherein when one of the virtual machines resumes executing after another of the virtual machines was executing, copying the data from the respective virtual machine queue to the processor queue.

41. The computer program of claim 37, wherein at least one of the wireless network applications is selected from the group consisting of:

- a wireless network access point;
- a wireless network client;
- a wireless network point-to-point bridge;
- a wireless network multi-point bridge; and
- a wireless network repeater.

42. The computer program of claim 37, further comprising:

- executing selected ones of the virtual machines in accordance with an input.

43. The computer program of claim 37, further comprising:
executing a plurality of the virtual machines concurrently.
44. A wireless network device for communicating with a network comprising:
memory means for storing an image comprising a plurality of virtual machines
and only one-multi-tasking operating system, wherein each of the virtual machines comprises a
wireless network application to execute on the multi-tasking operating system;
processing means for executing the virtual machines; and
bus means for communicating with the processing means and the network.
45. A wireless network device according to claim 44 which is compliant with a
standard selected from the group consisting of IEEE standards 802.11, 802.11a, 802.11b,
802.11g and 802.11n.
46. The wireless network device of claim 44, wherein the memory means comprises
non-volatile memory means, further comprising:
volatile memory means; and
memory controller means for creating a copy of the image from the non-volatile
memory means to the volatile memory means;
wherein the processing means executes the virtual machines from the volatile
memory means.
47. The wireless network device of claim 44:
wherein the memory means comprises a virtual machine queue means for each
virtual machine and a processor queue means for the processing means;
wherein the processing means stores data to be processed for the virtual machine
being executed by the processing means in the processor queue means;
wherein each virtual machine creates a copy in the respective virtual machine
queue means of the data in the processor queue means when the processing means is executing
the respective virtual machine; and

wherein when the processing means resumes executing one of the virtual machines after executing another of the virtual machines, the one of the virtual machines copies the data from the respective virtual machine queue means to the processor queue means.

48. The wireless network device of claim 44, wherein the image further comprises:
a plurality of virtual machine device drivers to communicate with the virtual machines; and
a bus interface driver to communicate with the virtual machine device drivers and the bus means.

49. The wireless network device of claim 44, further comprising:
a physical-layer device means for communicating with the network; and
media access control means for communicating with the physical-layer device means and the bus means.

50. The wireless network device of claim 49, wherein the image further comprises:
a plurality of virtual machine device drivers to communicate with the virtual machines;
a first bus interface driver to communicate with the virtual machine device drivers and the bus means;
a second bus interface driver to communicate with the bus means; and
a media access controller device driver to communicate with the second bus interface driver and the media access control means.

51. The wireless network device of claim 44, wherein at least one of the wireless network applications is selected from the group consisting of:
a wireless network access point;
a wireless network client;
a wireless network point-to-point bridge;
a wireless network multi-point bridge; and
a wireless network repeater.

52. The wireless network device of claim 44, further comprising:
input means for selecting one or more of the virtual machines;
wherein the processing means executes the virtual machines selected by the input means.

53. The wireless network device of claim 44, wherein the processing means executes a plurality of the virtual machines concurrently.

54. The wireless network device of claim 44:
wherein the virtual machines comprise a wireless network access point virtual machine and a wireless network client virtual machine;
wherein the processing means executes the wireless network access point virtual machine and the wireless network client virtual machine concurrently;
wherein the wireless network client virtual machine comprises
a first virtual wireless port to communicate with the bus means, and
a first virtual bridge to communicate with the first virtual wireless port;
and
wherein the wireless network access point virtual machine comprises
a second virtual wireless port to communicate with the bus means,
a virtual distribution service port to communicate with the first virtual bridge, and
a second virtual bridge to communicate with the second virtual wireless port and the virtual distribution service port.

X. Evidence Appendix APPENDIX B

Appellants are not submitting evidence other than that presented above.

- XI. Related proceedings Appendix APPENDIX C**
Appellants are not aware of any related proceedings.